PROSPECTS FOR INDIA'S CEREAL SUPPLY AND DEMAND TO 2020

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2020 BRIEF 63 ***A 2020 Vision for Food, Agriculture, and the Environment*** **NOVEMBER 1999**

Although many Indians still do not have an adequate diet, the national food situation is dramatically better today than 30 years ago. In 1970, India's population was only two-thirds its current size, but cereal production was only half the current level and the country was critically dependent on food aid to prevent widespread famine, particularly in drought years. Today, India is self-sufficient in cereals. The nation produces and consumes about 170 million metric tons of cereals each year (including seed and waste).

But will India continue to be self-sufficient in cereals in the years ahead? Over the next 20 years, will total cereal demand double again to over 340 million tons? Or will there be significant departures from past trends that may slow or increase growth in demand? And will national production of cereals continue to keep pace with demand, or will increasing resource scarcity and degradation—and already high use of high-yielding varieties (HYVs), fertilizers, and irrigation—limit future growth opportunities?

The answer depends on several factors: growth trends in population, per capita income, and urbanization; changes in taste as more people have better access to, and more information about, alternative foods; increased reliance on cereals for feed in response to rising consumption of meat products; and the impact of future economic growth on the poor.

Using 1993 as the base year, this study presents projections of cereal demand and supply balances to 2020 under alternative scenarios for income growth, consumption behavior, and agricultural production strategies.

THE CHALLENGES AHEAD: CEREAL DEMAND

India's agriculture sector is facing many pressures over the next two decades. Today's population of nearly 1 billion is projected to rise to 1.3 billion by 2020, with the share of the population living in urban areas rising from 26 percent to 35 percent of the total population. The possibilities for per capita income growth vary widely, from a best-case scenario of 6 percent average annual growth to a worst-case scenario of 2 percent per year. As a baseline case, this study assumed 3.7 percent growth, which is a little lower than the actual rate of growth achieved in recent years.

India's currently low per capita consumption of livestock products could change rapidly as the economy grows. Many more households are now consuming livestock products than a decade ago. There is also evidence that the average budget shares for milk and meat are increasing, apparently as a result of structural shifts in consumer preferences. Projected demand for meat and eggs in 2020 is 20 million tons, a fourfold increase over 1993 consumption of 5 million tons. Milk and milk products are projected to increase more than five times, from 52 million tons in 1993 to 289 million tons in 2020. These projections also imply significant increases in daily per capita consumption, from 0.016 to 0.041 kilogram for meat and eggs and 0.162 to 0.597 kilogram for milk and milk products.

As demand for livestock products grows, livestock producers are likely to greatly increase their use of cereal feeds. Today, less than 5 million tons of cereals (3–4 percent of total cereal production) are fed to livestock each year—most livestock still feed primarily on crop by-products, household waste, and open grazing areas. The baseline projection for cereal feed—50 million tons by 2020—is a more than twelvefold increase over 1993 and several times larger than other recent projections. The baseline projection for total cereal demand in 2020 is 296 million tons—50 million tons for feed and 246 million tons for direct human consumption. This would mean a doubling of cereal demand over 1993, which is comparable to the kind of increase that India experienced over the past 30 years.

PROSPECTS FOR CEREAL PRODUCTION

Projections of future cereal production cannot rely heavily on past trends. Further expansion of irrigated area will be costly, and agriculture must increasingly compete with industry and urban households for limited water supplies. There appears to be limited scope for further production gains from the greater use of improved varieties and fertilizers. Resource degradation also could become a significant constraint on future cereal production. Other sources of growth, such as improved crop management or advances in biotechnology, will be required if reasonable rates of increase of cereal production are to be sustained into the future.

With attainable increases on several fronts—a 50 percent increase in fertilizer use, some expansion in irrigated area, plus genetic and technical efficiency improvements—cereal production is projected to increase to about 260 million tons by 2020 (excluding seed and waste). Under the same scenario with worsening land degradation, production would be about 242 million tons; with reduced degradation, production could reach 279 million tons.

THE CEREAL GAP

Given these estimates of future demand and supply, cereal shortages are likely under the more plausible production scenarios. In the mid-range case, with per capita income growth averaging 3.7 percent, the cereal gap is likely to fall in the 36 to 64 million ton range (Table 1). With growth at 6 percent annually, it could increase to 115 to 142 million tons. Even if growth were to slow to a more historic rate of 2 percent per year, the cereal gap could still increase to as much as 25 million tons by 2020.

While some of the scenarios are based on speculative assumptions, the results show that there are plausible conditions

Table 1—Matrix of projected cereal gaps for India in 2020 under alternative demand and supply scenarios (million metric tons)

Supply scenario	Total supply (net of seed and waste)	Demand (food + feed) scenario		
		Authors' projections with per capita income growth of		
		2 Percent	3.7 Percent	6 Percent
Total demand		**257.3**	**296.2**	**374.7**
		(supply minus demand)		
1962/65–93 Trend extrapolated	**321.1**	63.8	24.9	–53.6
Reasonable increase in fertilizer and irrigation use	**232.2**	–25.1	–64.0	–142.5
Plus genetic and technical efficiency improvements	**259.9**	2.6	–36.3	–114.8
With additional land degradation	**242.1**	–15.2	–54.1	–132.6

under which India could have cereal deficits of 36 to 64 million tons per year by 2020. If deficits of this magnitude were to materialize, India's cereal needs would have significant impacts on world cereal markets, as well as on the country's trade balance. But such deficits can be avoided through appropriate agricultural policies.

THE POLICY OPPORTUNITY

The likelihood of a supply-demand imbalance over the next two decades is an important opportunity for India's decision-makers, both in terms of national food security and rural development. It emphasizes the need for policies that increase domestic livestock and cereal production, and in the process increase incomes and employment and reduce poverty in rural areas. This would require additional policy reforms and market liberalization to bring price ratios more in line with world prices, and additional public investment in agriculture and rural areas.

The policy reforms begun in the early 1990s have yet to be fully completed for many domestic agricultural markets. Many farmers have been squeezed between the rising costs of key inputs (as subsidies have been removed) and declining farmgate prices. The latter have been aggravated by restrictions on exports, cheap imports, and excessive regulation of agro-industry. Completion of the reform process with full liberalization of domestic markets, foreign trade, and agro-industry would improve the terms of trade for many farmers and encourage greater cereal and livestock production. Such growth could include many of the poorer rainfed areas.

As in the past, public investment in rural infrastructure, agricultural research and extension, and the education and health of rural people will continue to play a key role in determining the rate of agricultural growth. Maintaining an adequate growth rate will also require that rainfed areas receive a larger share of any additions to public investment. Recent evidence suggests that while infrastructure investments have yielded the highest returns in irrigated areas in the past, this has been less true in the post-Green Revolution era. In fact, the marginal returns to several infrastructure investments are now higher in many rainfed areas, and they also have a potentially greater impact on reducing rural poverty. Investment in infrastructure in rainfed areas can thus offer India a "win-win" strategy for addressing productivity and poverty problems.

The Indian government already spends more on agriculture than almost any other Asian country. But the lion's share of this expenditure goes to subsidies for farm inputs, particularly fertilizers, credit, water, and electricity. These subsidies contribute very little to agricultural growth today. As such, there is considerable scope for achieving greater growth in agriculture simply by redirecting public funds that are already expended on the sector. There is also scope for reducing the cost of providing public goods in rural areas by a) forming new partnerships between the public, private, and NGO sectors to take better advantage of alternative and lower cost sources of supply of public goods; and b) improving the efficiency of public supply institutions through improved management, more transparent procurement and operational procedures, and greater accountability to end users.

A combination of greater productive investments plus more favorable terms of trade for agriculture could bring about an additional 20–30 million tons of cereals by 2020. With parallel increases in livestock productivity, the projected food gaps should be manageable.

For further reading see Kumar, P. 1998. *Food Demand and Supply Projections for India.* Agricultural Economics Policy Paper 98-01. New Delhi: Indian Agricultural Research Institute.

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This brief is based on 2020 Vision Discussion Paper 29 of the same title.